V. ASSESSMENT OF ABUNDANCE ESTIMATES

California Chinook Estimates

Sacramento River

The preseason estimates of Sacramento River fall chinook salmon stock abundance in 1985 were based on recent years' landings and harvest rates with considerations given for brood year natural escapement, hatchery releases, and 1984 jack returns. Results comparing projected with actual estimates for ocean chinook salmon fisheries south of Point Delgada and spawning escapement of Sacramento River fall chinook salmon are presented in Table V-1 and V-2.

The total preseason estimate of ocean landings south of Point Delgada plus spawning escapement of 533,900 was 28 percent below the postseason estimated total of 681,800. The projected total ocean landings of 364,000 were 31 percent below the postseason estimate of 477,100; the spawning escapement projection of 169,900 was low by 20 percent. The troll harvest preseason estimate was low by 29 percent and the preseason sport estimate was low by 37 percent.

Klamath River

Preseason estimates of ocean abundance and ocean escapement for Klamath River chinook were based on a cohort regression analysis and an ocean fishery simulation model. There was no ocean commercial fishing between Point Delgada and Cape Blanco in 1985. The preseason estimates of ocean sport landings in the Klamath River management area, and of Klamath River ocean escapement, were low by 284 percent and 6 percent, respectively (Table V-1 and V-2).

The large sport catch in the Klamath River management zone was probably attributable to high availability of fish in the close vicinity of the major landing ports and the absence of the commercial fishery. The sport fisheries out of Eureka, Trinidad, Crescent City, and Brookings are primarily skiff fisheries. Sport skiffs generally fish within a few miles of port and are highly dependent for their success on salmon feeding patterns and migration routes relative to the port entrances. The absence of the commercial fishery increased the abundance of fish available to the sport fishery, but probably not to the extent that the landings might indicate compared to previous years.

Oregon Coastal Chinook Estimates

Abundance estimators and indices used to evaluate trends in abundance of Oregon coastal wild chinook stocks south of Cape Falcon have been described in Chapter II. Assessment of these chinook stocks is complicated because of differing ocean distribution characteristics of major stock groups (subunits). One subunit, of predominately fall stocks, originates from the Elk River to the Nehalem River and contributes mainly to ocean fisheries off British Columbia and Alaska. A second major subunit, containing fall and spring chinook originating south of the Elk River and including Umpqua River spring chinook, contribute primarily to ocean fisheries off southern Oregon and northern California.

Table V-1. Assessment of 1985 preseason stock estimates for California chinook.

Management Area	Key Chinook Stock(s)	Category	Estimate		Error (Percent)
			Preseason	Postseason	
South of Point Delgada	Sacramento River Fall Run	Ocean Troll Harvest	278,800	360,300[a/]	- 29
		Ocean Sport Harvest	85,200	116,800	- 37
		Ocean Total	364,000	477,100	- 31
		Spawning Escapements	169,900	204,700	- 20
		Total	533,900	681,800	- 28
Point Delgada-Cape Blanco	Klamath River Fall Run	Ocean Troll Harvest	0	0	-
		Ocean Sport Harvest	20,800	79,900	-284
		Ocean Total	20,800	79,900	-284
		Spawning Escapements	55,700	59,300	- 6

a/ Includes 4,800 landed in the Eureka-Crescent City areas but caught outside the management zone.

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Table V-2. Expected and actual escapements of selected chinook stocks in 1985 (thousands of fish).[a/]

Stock	Ocean Escapement			Spawning Escapement	
	Preseason	Postseason	Goal	Postseason	Goal
Sacramento	169.9	-	-	204.7	122-180
Klamath	55.7	59.3	87.2[b/]	43.9	
Brights	159.1	193.1	-	94.6[c/]	40.0
Lower River Hatchery Tules	86.7	108.3	90.6	35.1	37.4
Spring Creek Tules	37.1	33.0	38.8	5.4	8.2

a/ Preliminary.
b/ Average 1985-1986 ocean escapement goal to meet an average of 68.9 for the period 1983-1986.
c/ Escapement above McNary Dam. Liberalized sport fisheries in the Hanford Reach harvested about 5.1 adult upriver bright fall chinook.

Quantitative preseason projections of total run size for either subunit are not made; however, ODFW develops generalized forecasts of a qualitative nature. These generalized forecasts are developed from a variety of population measurements for each subunit. In 1985, ODFW began development of a comprehensive coastal chinook management plan. It is expected this plan will be completed in 1987.

Columbia River Chinook Estimates

Preseason estimates of Columbia River fall chinook inriver abundance are based on relationships between successive age groups within a year class. Historic abundance data used in formulation of these relationships are derived by combining estimates of harvest and escapement and reconstructing the inriver runs originating from both hatchery and natural production sources. Four individual fall chinook stocks are classified according to destination above or below Bonneville Dam and known characteristic differences such as maturity rate, run timing, and ocean distribution. The data base used for inriver abundance estimation includes estimates of the return by age group for the years 1964 to 1984. Catches and escapements of individual stocks are estimated from coded-wire-tag recoveries, dam counts based on skin color proportions, and other techniques. Age composition estimates are based on scale reading of fishery and escapement samples. This data base is the source for tables of annual inriver returns presented in Appendix B (Tables B-16 through B-19).

Preliminary estimates of abundance used in analyzing impacts of different regulatory options considered by the Council are presented in Table I-1 of the Council's March preseason document concerning stock status. The preseason estimates presented assume a constant or average ocean harvest. Final preseason expectations of inriver abundance were dependent on adopted regulations and were based on the assumption that ocean fisheries would harvest their full quotas for chinook in the area north of Cape Falcon. In addition, it was assumed that the newly ratified Pacific Salmon Treaty between the U.S. and Canada would not provide additional ocean escapement as a result of harvest quotas imposed on the Canadian troll fishery operating off Vancouver Island.

Preseason estimates of ocean escapement are compared with preliminary postseason estimates for critical stocks in Table V-2. The greatest relative error is observed for the LRH stock, the preliminary postseason estimate being 25 percent greater than the preseason estimate. The upriver bright stock returned 21 percent above the preseason expectation. The preseason estimate for the Spring Creek Hatchery stock, the most critical for determination of allowable harvest in ocean and inriver fisheries in 1985, overestimated inriver return by 11 percent. Considering that the overall ocean fishery chinook quota for the area north of Cape Falcon was not fully harvested, the expectation is that preseason inriver estimates of the Spring Creek and Lower River hatchery stocks would tend to be underestimates. These stocks are affected significantly by ocean fishery harvest in this area.

Genetic stock identification (GSI) methods applied to ocean fishery harvest formed a significant part of the preseason impact assessment for these chinook stocks. The allowable harvest of all stocks in 1985 fisheries was based on the impact on depressed tule stocks. It was assumed that the contribution made by these stocks in 1985 would be similar to contributions estimated for

1983 ocean fisheries. Samples for GSI analysis were collected from ocean troll and sport fishery landings during the 1985 season but final results are not available at this time. Preliminary results show that tule stock contribution was approximately 50 percent overall while the preseason expected contribution was 53 percent. For 1985 management, preseason expectations used for stock impact assessment adequately reflected actual stock status, particularly for the most critical stocks.

Oregon Production Index Area Coho Estimates

The Council manages coho south of Leadbetter Point as a management unit known as the OPI area. Within this area are two major management subunits, the Columbia River area north of Cape Falcon and another for the area south of Cape Falcon, including California. For 1985, the Council evaluated management strategies for the Columbia River area that considered the stock status of and harvest impacts on the Columbia River coho and chinook stocks as well as Washington coastal and Puget Sound stocks. For south of Cape Falcon the major concern was for rebuilding OCN spawning coho and to provide an ocean escapement level sufficient to meet the 1985 OCN rebuilding goal of 175,000 coho.

OPI area stock status was evaluated using the OPI abundance jack predictor to determine an "index" of adult abundance. As per procedures described in the framework plan, an estimate was made of the OPI area ocean escapement needed to meet the 1985 OCN rebuilding goal. The SPDT also reviewed a methodology developed by the ODFW and WDF that proposed partitioning the OPI into its major stock components and making separate stock size estimates for each. Because of untested assumptions employed in developing certain components of the underlying data and deviations from historic fishing patterns, the SPDT and Scientific and Statistical Committee were unable to determine the reliability of the partitioning approach. Both methods were discussed in the 1985 salmon management planning documents and are compared below. The Council also considered both methods, and while not adopting the ODFW-WDF procedure, enacted 1985 season regulations for the 1985 season that approximated impacts presented by the ODFW-WDF analysis.

Preseason Estimates

Framework Amendment Methodology - The OPI is used as a measure of the annual abundance of adult three-year-old coho salmon resulting from production in the Columbia River and Oregon coastal hatcheries and streams. The index itself is simply the combined number of adult coho that can be accounted for within the general area south of Leadbetter Point, Washington. Specifically, it is the sum of (1) ocean sport and troll impacts (catch plus hooking mortalities) in the Columbia River area (south of Leadbetter Point), and off Oregon and California, regardless of stock origin; (2) Oregon coastal public hatchery returns and returns from off-station releases; (3) the Columbia River inriver gillnet catch, Bonneville Dam, and Willamette counts, hatchery returns to the Columbia River below Bonneville Dam; and (4) Klamath River hatchery returns.

The OPI area abundance predictor, relating public hatchery jack returns to subsequence adult run size, was utilized to predict an "index" of adult run size. As noted, the OPI is not an absolute measure of the total number of fish available in the OPI area. Natural Oregon coastal coho escapement and

private hatchery fish are not included in the index value. As such, the portion of fish unaccounted for will vary with stock size, percentage of fish escaping the fishery, and the ratio between hatchery and wild fish. Added to this index value was an independent estimate of private hatchery fish. A discussion of this methodology appears in the "1984 Ocean Salmon Fisheries Review" (pages V-10 through V-15).

Preseason abundance estimates of coho salmon in the OPI area were first applied to management of the ocean salmon fisheries in 1979 and have been utilized annually since that time. Following the 1982 season, a complete review of the OPI stock abundance estimation procedure was undertaken to improve accuracy. The 1983 data point was not used in the predictive data base due to the abnormal adult mortality associated with the 1983 El Nino which caused a significant predictive error that year. Therefore, the 1977-1984 predictive data base (without 1983) was again used to predict adult abundance in 1985 based on 1984 jacks. Table V-3 and Figure V-1 show the data and regression relationship which make up the 1977-1984 jack to adult relationship and the predicted 1985 values. It should be noted that due to minor updates (e.g., finalized ocean landing data, jack counts, etc.), the data base in the 1985 relationship varies slightly from that utilized in the 1984 relationship ("1984 Ocean Salmon Fisheries Review," Table V-4 and Figure V-2).

Adjusted jack returns to index areas during the fall of 1984 were 29,300 fish, the lowest observed count since 1969 (Table V-3). The OPI preseason index abundance estimate for 1985 was calculated to be 615,900 coho.

Private Hatchery Estimate - Estimation of 1985 private hatchery stock size and catch contribution to the OPI area was made independently of either method described above. It is based on past private hatchery survival rates by hatchery, release type (i.e., 0-age or yearling), and numbers released. Returns from releases of 10.9 million coho at private coastal facilities were expected in 1985. This represented a significant reduction from the release of 16.3 and 23.1 million which contributed to the 1984 and 1983 returns, respectively. Private hatchery coho were expected to contribute approximately 24,000 fish to OPI area fisheries from releases of 10.9 million.

Determination of OPI Allowable Harvest - A primary concern in management of the OPI area is to allow sufficient escapement of enough OCN spawning coho to meet the current rebuilding goal. The goal for 1985 was 175,000 fish (Table V-4). The SPDT employed procedures described in the framework plan to assess regulatory impacts on OCN stocks. These procedures utilize a regression model that relates adult ocean escapements to OPI index areas and OCN escapements (Figure V-2). This relationship, as well as the 1985 OPI jack abundance predictor, are described in detail in the "1985 Stock Status Projections, Management Goals and Regulation Impact Analysis" (March 1985).

Preseason Forecast - Based on an estimated OPI index abundance of 615,900 and a OPI catch of 356,000, the regression analysis by the SPDT indicated that the OCN escapement would be 105,200.

Alternative Partitioning Methodology - In 1985 the ODFW and WDF staffs recommended to the Council a modification to the present OPI area predictive method. It was intended to provide an alternative predictive assessment tool for area managers by transforming the present "index" of OPI area coho

Table V-3. Relationship of Columbia River and Oregon coastal coho jack index to the OPI for coho adults (thousands of fish), 1970-1985.

Year of Adult Production	Jacks of Previous Year[a/]			Adult Production Index[b/]	
	Columbia[c/]	Coastal[d/]	Total	Expected[e/]	Observed
1970	147.6	18.0	165.6	-	2,794.1
1971	171.7	6.6	178.3	-	3,658.1
1972	98.3	4.1	102.4	-	2,036.5
1973	82.9	5.7	88.6	-	1,994.6
1974	127.8	14.0	138.8	-	3,128.5
1975	72.8	1.2	74.0	-	1,768.2
1976	144.5	32.2	176.7	-	4,110.7
1977	46.1	9.3	55.4	1,034.8	1,122.6
1978	98.4	4.9	103.3	1,803.6	1,854.0
1979[f/]	74.6	12.5	87.1	1,543.6	1,568.4
1980[f/]	69.2	7.0	76.2	1,368.7	1,255.8
1981[f/]	51.9	9.3	61.2	1,127.9	1,165.3
1982[f/]	67.6	9.1	76.7	1,376.7	1,309.3
1983[f/]	81.2	9.0	90.2	1,593.4	663.0
1984[f/]	29.8	3.3	33.1	676.9	658.7
1985[f/]	20.5	8.8	29.3	615.9	727.1

a/ Components of jacks are ODFW and WDF hatcheries below Bonneville, Willamette, Winchester, and North Fork dam counts, and Oregon and California coastal hatchery counts.

b/ OPI includes: (1) ocean impacts off the Columbia River, Oregon, and California; (2) Oregon and California coastal hatchery returns; (3) Winchester Dam counts; (4) gillnet catches; (5) Bonneville, Willamette, and North Fork dam counts; and (6) hatchery returns to the Columbia River below Bonneville Dam. OPI has been adjusted to exclude the catch of coho originating from private hatcheries beginning in 1979.

c/ Columbia River jack counts were adjusted to account for the lower jack: adult ratio and higher survival observed for delayed smolt released affecting the 1979-1984 adult production.

d/ Includes estimated returns of jacks and adults to Oregon and California coastal areas from off-station hatchery releases. These estimated returns are based on the percentage of the total smolt releases liberated off-station and the actual return to the hatchery. The basic assumption is that the survival is identical to hatchery releases and the fish return to the liberation site in the same proportion.

e/ Expected values calculated using 1977-1983 data base, but excluding 1983 because of major El Nino influence. Expected OPI values differ slightly from earlier years because of an additional data point, recalculation of regression relationship, and minor updates on ocean catch information.

f/ Data are preliminary.

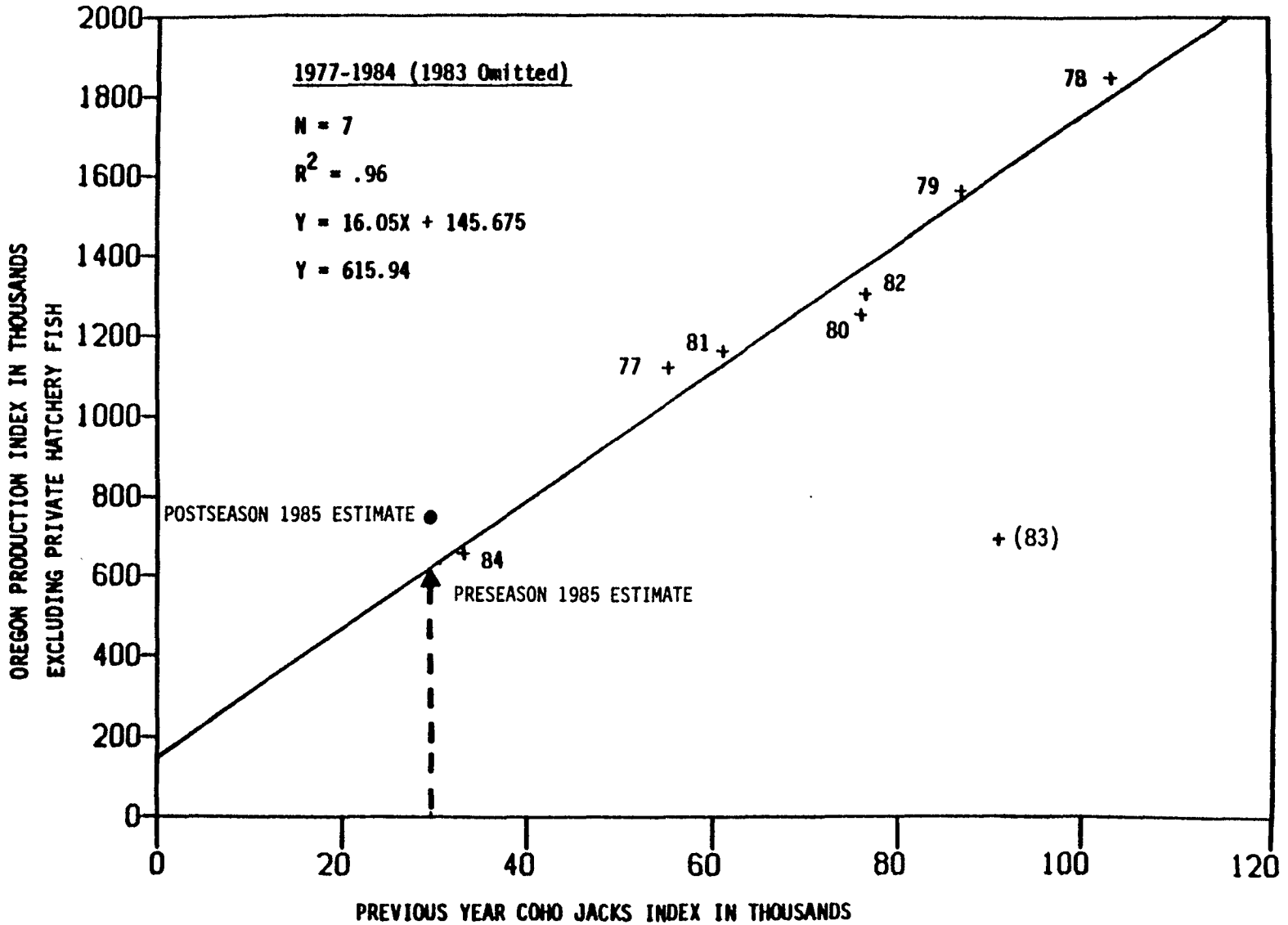

Figure V-1. Relationship of the Oregon production coho index to the Columbia River and Oregon-California coastal coho jack index for the base years 1977-1982 plus 1984.

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Table V-4. Adult escapement of natural spawning stocks of Oregon coastal coho in thousands of fish. Parentheses indicate rebuilding schedule goals.

Cycle	Year of Adult Return										
	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989
1	172			129 (172)			167[a/] (175)			(200)	
2		108			57 (140)		(170)			(200)	
3			73 (175)			200.1 (135)		(200)			

a/ Preliminary.

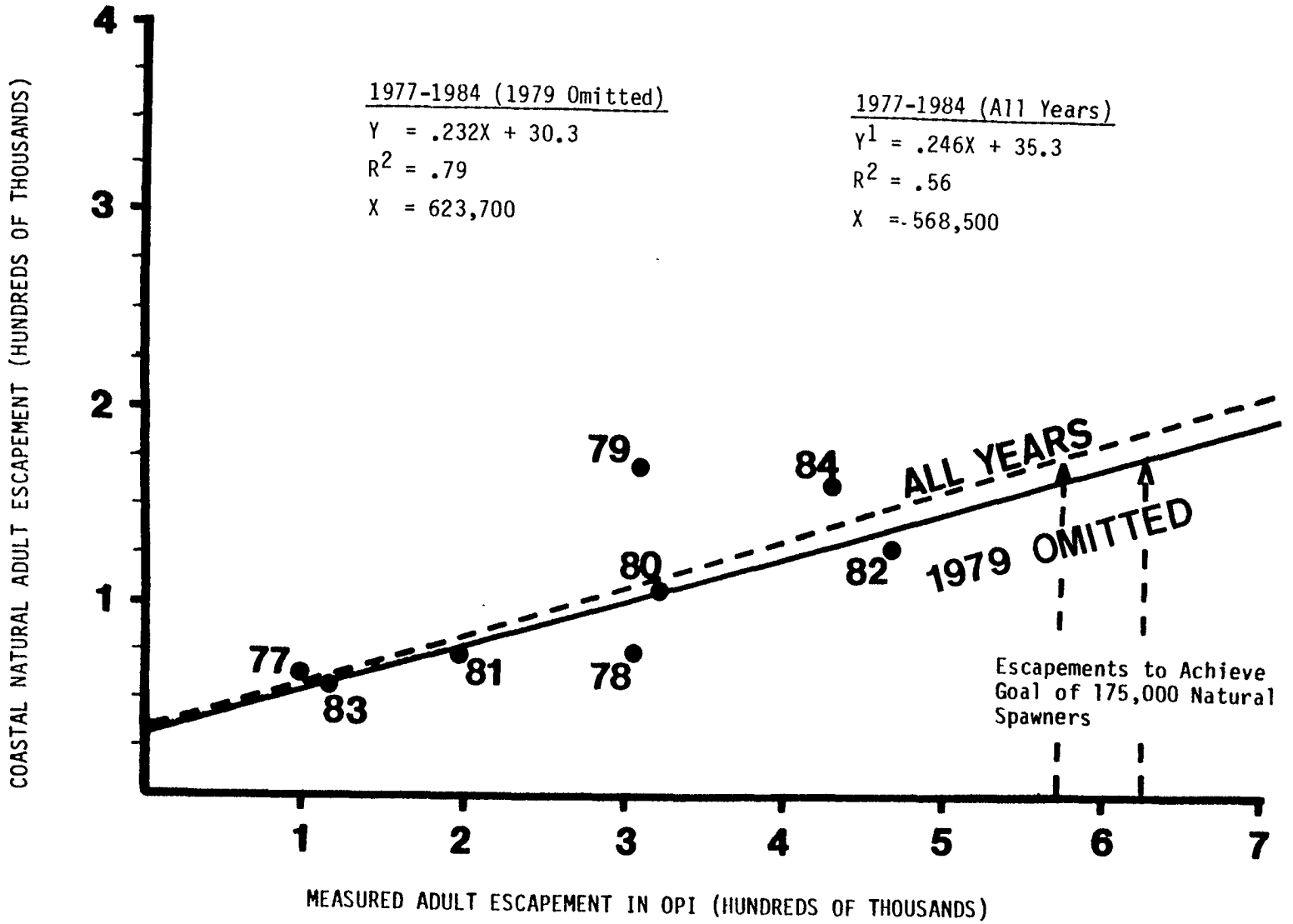

Figure V-2. Relationship between the natural adult coho escapement of Oregon coastal rivers and the measured escapement of adult coho to the OPI, 1979-1984.

abundance into several OPI stock group components for which independent predictions of abundance could be made. Collectively, these components, and the abundance estimates made for each, would give a total abundance estimate of OPI area stocks. The presently used technique already began that process with separate predictions of OPI area public hatchery production (the OPI abundance predictor, jack index) and for private hatchery coho. The modified forecasting technique would complete that process by predicting the following components: (1) OPI area public hatchery coho (excluding the Rogue and Klamath river hatchery coho), (2) Rogue and Klamath river hatchery coho, (3) OCN coho, and (4) private hatchery coho (independently predicted in both methods). A detailed review of how this methodology would be developed and applied was presented to the Council at their April 1985 meeting after review by the SPDT, other Council entities, and the Oregon and Washington staffs. A discussion of this methodology is also presented in the "1984 Ocean Salmon Fisheries Review" (page V-15), "1985 Proposed Regulatory Options and Regulatory Impact Analysis" (pages 13-16), and in the "Analysis of Impacts of 1985 Council Adopted Regulations" (pages 8-9). The OPI area coho stock components incorporated in the WDF/NBS regulatory analysis model are shown in Table V-5.

The WDF/NBS ocean fishery regulatory analysis model assesses stock impacts of fisheries throughout the Council management area, including the impact on OPI stocks by fisheries outside the index area and non-OPI stocks by OPI area fisheries.

Preseason Forecast - The SPDT evaluated the partitioning method in comparison to the current procedure. A comparison of results for the two methods, with reference to their impact on the OCN coho escapement under the Council-adopted regulations allowing a 356,000 coho impact in the OPI area, appears in the "Analysis of Impacts of Council Adopted 1985 Regulations" (pages 8-9).

The OPI area partitioning analysis indicated that OCN coho escapement would be approximately 172,600, with the 1985 Council-adopted regulations.

Postseason Evaluation

Framework Amendment OPI Area Abundance Predictor - Excluding private hatchery catch, the preseason 1985 OPI abundance index prediction of 615,900 was 111,200 (18 percent) below the postseason estimate of 727,100 (Table V-6). The higher estimate was primarily the result of higher stock sizes for Columbia River early (Toutle) and late (Cowlitz) coho stocks.

Private Hatchery - The preseason estimate of private hatchery contribution to OPI area fisheries of 24,000 was 129 percent below the postseason estimate (based on coded-wire tags) of 54,900. The postseason estimate of total Oregon private hatchery stock size of 364,600 fish was 277 percent above the preseason estimate of catch and escapement of 96,800 (Table V-7). This is the largest deviation to date. This year's survival of 3.3 percent represented a considerable increase over that of previous years (range from 0.9 to 1.7 percent). The 1985 preseason estimate of smolt survival was 0.95 and 0.65 percent for the Ore-Aqua and Anadromous hatcheries, respectively. The poor jack return to coastal public hatcheries in the fall of 1984 also tended to suggest a lower survival rate for 1985.

Table V-5. OPI area origin coho stock components used in the WDF/NBS model.

Stock Aggregate	Components	Predictive Methodology 1985
Columbia River early	Columbia River early stock hatchery coho	Jack returns
Columbia River late	Columbia River late stock hatchery coho	Jack returns
Oregon Coastal public hatchery and natural	Oregon coastal hatchery	Jack returns
	Oregon coastal natural	Estimated smolt production and representative base period survival
Rogue-Klamath	Rogue River and Klamath hatcheries	Jack returns
Private hatchery accelerated-mixed stocks	Private hatchery production from Puget Sound stocks	Smolt releases and representative base period survival
Private hatchery accelerated Oregon	Private hatchery production from Oregon coastal stocks	Smolt releases and representative base period survival

Table V-6. Comparison of the preseason estimate and actual observed abundance of OPI coho and the ocean catch of private hatchery fish in the OPI area in 1985.

Component of Stock Size Estimate	1985 Preseason Estimate	1985 Observed[a/]	Deviation of 1985 Observed Value From Preseason Estimate	
OPI Abundance Predictor (Jack Index)	615,900	727,100	+111,200	+ 18%
Private Hatchery Ocean Catch	24,000	57,900	+ 30,900	+129%
Total	639,900	782,100	+142,200	+ 22%

a/ Preliminary.

Table V-7. Comparison of preseason projection and actual ocean contribution and return of Oregon private hatchery adult coho (thousands of fish), 1981-1985.

Year	Preseason Estimate			Postseason Estimate			Deviation of Projected from Actual Total Production
	OPI Ocean Harvest[a/]	Return to Facility	Total Product.	OPI Ocean Harvest[a/]	Return to Facility[b/]	Total Product.	
1981	140.0	67.4	207.4	142.0	111.3	253.3	+ 22%
1982	193.3	180.6	373.9	122.1	176.9	299.0	- 20%
1983	103.0	103.0	206.0	110.3	133.1	243.4	+ 18%
1984	16.0	68.0	84.0[c/]	35.0	114.9	149.9	+ 78%
1985	23.7	73.1	96.8	54.9[d/]	309.7	364.6[e/]	+277%

a/ Estimates based on coded-wire-tag recoveries.
b/ In 1985 adult coho estimates were recalculated using biological jacks determined from scale samples rather than length frequency.
c/ Adjusted downward 29 percent for El Nino impact.
d/ In addition, an estimated 20,500 coho were harvested in 1985 north of Leadbetter Point, including Canada.
e/ Does not include the estimated ocean harvest north of Leadbetter Point, including Canada. For 1985, this catch was estimated from coded-wire tags to be 20,500; giving a total production of 385,100. These catches have not yet been calculated for earlier years.

Framework Amendment Method Versus Partitioning Method - Although final surveys on Oregon coastal streams are not complete, preliminary estimates indicate the OCN coho escapement to be at least 166,700 natural adult spawners. It is anticipated the final assessment of OCN coho escapement in index areas will approach or surpass the 175,000 goal.

The use of OPI area ocean escapement to index areas as a means to indirectly project OCN coho escapements, combined with major changes in the dynamics of regional fisheries and stocks, indicate that problems exist with current procedures employed for regulatory impact assessments in the OPI area. This relationship should be critically reviewed by the SPDT. A number of problems were observed in 1984 and 1985 that suggest that the reliability of procedures described in the framework plan may be questionable under low stock abundance conditions or changes in fishing patterns and stock contributions and exhibit considerable variability at higher stock abundances. In 1984, the framework procedures indicated that an ocean escapement of 488,000 coho to OPI index areas was needed to provide an OCN coho escapement of 135,000. Postseason evaluation demonstrated that an actual OPI area escapement of 430,700 coho to OPI index areas yielded an OCN wild coho escapement of 176,300 out of a total escapement of 200,100. Similarly in 1985, framework plan procedures indicated that an ocean escapement to OPI index areas of 568,500 was required to attain the OCN escapement goal of 175,000. Under the stock conditions and fishing patterns observed in 1985, postseason analysis indicates that the actual OPI index area escapement of 386,000 produced an escapement (preliminary) of 166,700 coho (including some hatchery-produced strays).

Postseason evaluation of the two OPI assessment methodologies is difficult because of interactions between stock sizes and fishing patterns. The actual OCN coho escapement should be significantly higher than preseason estimates made through either method because higher than anticipated OPI and private aquaculture stocks sizes resulted in lower than predicted ocean harvest rates.

Within the limited time available for analysis, a comparison of the alternative OPI methodologies was limited to evaluation of actual versus expectations of OCN and OPI escapements. Given the OPI index area escapement of 386,000 observed in 1985, the framework plan procedures would estimate an OCN escapement of approximately 140,000 coho while the partitioning approach would estimate an escapement of approximately 203,400 coho. Based on the preliminary OCN escapement estimate of 166,700, the framework plan procedures underestimate OCN escapement while the partitioning method overestimates OCN escapement.

An additional analysis illustrating preseason and postseason OPI area coho analyses for 1984 and 1985 appears in Table V-8.

Columbia River Late Coho Estimates

Abundance of the late-timed component of Columbia River coho production was estimated separately from other OPI components for preseason planning purposes. The need for a separate prediction of late coho run strength was

Table V-8. Comparison of preseason and postseason estimates for the 1984 and 1985 OPI area harvests, harvest impacts, and escapements (thousands of coho).

Estimate	1984 Preseason	1984 Postseason	1985 Preseason	1985 Postseason
TOTAL OPI AREA CATCH/IMPACTS	180.4[a/]	260.9[a/b/]	356.0[c/]	401.8[c/d/]
Columbia River Area	55.4	65.4[b/]	131.0	140.3[d/]
South of Cape Falcon	125.0[a/]	195.5[a/]	225.0[c/]	261.5[c/]
OPI AREA INDEX PREDICTOR	564.6[e/]	658.7	615.9	727.1
PRIVATE HATCHERY CATCH	16.0	35.0	24.0	54.9
OCN COHO ESCAPEMENT ANALYSIS				
Team Analysis				
OPI Ocean Escapement	488.0	442.8	284.0[f/]	386.0
OCN Spawning Escapement	117.0	200.1	105.2 (96.2)[h/]	175.0[g/]
ODFW Analysis[i/]				
OPI Ocean Escapement	365.5	442.8	327.5	386.0
OCN Spawning Escapement	139.0[j/]	200.1	172.6[k/]	166.7[g/]

a/ Includes estimated postseason south of Cape Falcon troll hooking mortality estimate of 24,000 coho. Preseason estimate of 19,000.
b/ Includes postseason estimate of 800 coho hooking mortality from May chinook-only troll fishery (Klipsan Beach to Queets River).
c/ Includes estimated postseason south of Cape Falcon troll hooking mortality estimate of 44,000 fish. Preseason estimate was 10,000.
d/ Includes impact of 10,500 coho from Buoy 10 fishery (Columbia River estuary), August 18-21. Columbia River area preseason troll coho quota adjusted down from 32,500 to 10,000.
e/ Adjusted for El Nino via Council-adopted procedure proposed by ODFW. SPDT analysis indicated slightly lower assessment at 556,600 coho. Both estimates calculated from unadjusted OPI of 806,600.
f/ Preseason ocean escapement estimate (284,000 coho) was expected escapement given Council-adopted regulations for 1985 season. To obtain 1985 OCN coho rebuilding goal (175,000), the SPDT estimated preseason that an OPI area ocean escapement of 568,500 coho (or 623,700 coho if a slight variation of relationship noted in footnote h is used) would be needed.
g/ Preliminary estimate by ODFW indicates that 1985 OCN goal is likely to be reached or exceeded.
h/ Preseason OCN coho escapement estimated using present relationship comparing OPI area ocean escapement to OCN coho goal.
i/ ODFW analysis using WDF/NBS coho assessment model. Joint ODFW/WDF analysis for 1985.
j/ Developed from independent predictor of OCN wild jack returns (selected streams) to adult returns.
k/ ODFW/WDF prediction of OCN coho escapement using OCN coho smolt production and projected survival to adult. One of several "partitioned" estimates for OPI area stocks predicting stock size for each in 1985.

explained by a sharp decline in the return of late-stock jacks, the 1984 return being less than half the previous record low number.

Historical total abundance of the late stock was estimated by dividing the terminal run estimate by the estimated OPI ocean escapement rate on an annual basis. Estimated total abundance was regressed against the brood year return of jacks to late stock hatcheries (Cowlitz and Lewis). Though the 1984 jack return was outside the historical data base, a prediction for 1985 abundance was based on this relationship. The predicted abundance was 101,200, approximately one-half the record low estimated late stock abundance of 1984 (199,400).

Given the Council's adopted ocean fishery regulations (including inseason adjustments to harvest quotas), the expected return of late coho to the Columbia River was approximately 47,000. A very preliminary estimate of the actual return is 134,000. Applying a very preliminary OPI ocean fishery escapement rate for 1985 (.62) to the estimated late stock return produces a total abundance estimate of 216,000, approximately twice the preseason estimate.

Washington Coastal and Puget Sound Coho Estimates

A variety of preseason abundance estimators are currently employed for Washington coastal and Puget Sound coho stocks. For natural stocks, estimates are derived by: (1) parent spawner abundance expanded by average recruit per spawner, (2) the relationship between return of jacks and adults, and (3) summer stream flows. For hatchery stocks, predictions involve: (1) coded-wire tag based survival rates and (2) average adult return per smolt released. The SPDT has not formally assessed these prediction methods.

Assessment of predictor performance for 1985, at this time, is difficult because of the preliminary or unavailable status of run-size information for many stocks. Preseason estimates of ocean escapement for critical stocks are compared to preliminary postseason estimates in Table V-9. It appears that preseason estimates for most Washington coastal stocks overestimated ocean escapement.

Table V-9. Preseason expected and preliminary postseason estimates of escapement for critical coho stocks in 1985 (thousands of fish).

Stock	Ocean Escapement		Spawning Escapement	
	Preseason	Postseason	Postseason	Goal
Skagit	26.1	NA	NA	30.0
Stillagamish	25.2	NA	NA	17.0
Quillayute Fall	19.2	15.3	7.5	6.3-15.8
Hoh	6.6	5.5	2.1	2.0-5.0
Queets	11.3	6.1	4.0	5.8-14.5
Grays Harbor	56.4	NA	NA	35.4
Columbia River Late	47.9	130.0	NA	40.0-50.0[a/]
Oregon Coastal Natural				
Team Analysis	105.2			175.0
Partitioning	172.6		166.7	175.0

a/ Ocean escapement goal for 1985.